

Indianhead Lentil as an Annual Legume
Green Manure Crop for Saskatchewan

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Recent studies suggest that total on-farm costs of land degradation in Canada are between \$750 million and \$1.2 billion annually. The common practice of summerfallow, and particularly the manner in which this practice is conducted, is largely responsible for soil degradation in our country. Summerfallow need not be airborne or accumulate in fencelines or ditches.

Saskatchewan farmers can reduce soil degradation. They have many options at their disposal. One such option is reduced tillage, another is zero tillage. One of the latest options is the Indianhead lentil. This new and innovative lentil was developed by Dr. A. Slinkard at the Crop Development Centre, University of Saskatchewan, and registered in 1986.

Interestingly enough, the Indianhead lentil was nearly discarded in 1982 because seed yields were considered average at best. The original selection was given one final opportunity when it was included in a late-seeded nursery at Hagen. The result was a dense mat with very little seed. That was the beginning of the Indianhead lentil as a green manure crop.

The Indianhead lentil is a small, black seeded variety. The seed size reduces seeding costs. The black seed distinguishes this variety from the light green lentil cultivars grown for the export market and human consumption.

The Indianhead lentil has a strong, indeterminate growth habit and is late maturing. It has a high total dry matter production compared to the Eston lentil. This cultivar has demonstrated good drought tolerance.

Many farmers in West Central Saskatchewan have, over the years, included biennial and perennial legumes in their short crop rotations. However, the typically dry conditions usually limit both legume growth and nitrogen fixation. And when a good growth is achieved, soil moisture depletion by the legume creates a moisture deficit for subsequent crops. Typically, the yeild of a grain crop following a perennial or biennial legume in the Brown and Dark Brown Soil Zones is depressed. Short term economics suggested that this was not a profitable practice.

It was therefore suggested that what we, in the drier parts of the province, really needed was a water use-efficient, annual legume.

While several annual legumes have been studied under Saskatchewan conditions, Dr. Slinkard has reported that the Indianhead lentil

is the only annual legume tested under our conditions where the value of the nitrogen fixed per acre consistently exceeds seed cost per acre.

This means that all the other benefits of a legume in rotation are a bonus. These include readily decomposable organic matter, a vegetative cover for wind and water erosion control, increased soil tilth and a potential snow trap.

With this potential in mind and the fact that 35-40% of the cultivated land in the West Central Region is summerfallowed annually, we set out to demonstrate the Indianhead lentil and assess the various management options. The project was funded by Ducks Unlimited. Their support and cooperation is gratefully acknowledged.

Ag. Reps. in the seven Extension Service districts in our Region located ten cooperators. Many of the cooperators had previously tried sweetclover as a plow-down crop. Each cooperator was supplied with an adequate quantity of seed to establish an 8-10 acre site. They were asked to pre-till the field, seed at a rate of 30 lbs per acre, to inoculate the seed and to correct phosphate deficiencies.

The Indianhead lentil offers three tested systems: early seeding combined with plow-down, early seeding combined with herbicide to

terminate growth, and late seeding for snow trap.

Seven cooperators were asked to seed in early May, two in mid June and one in early July.

The early May seeding resulted in fair to good emergence in all but one case. Growth, in most cases, was slow due to drought stress. Showers in mid June improved growth in most fields. Many of the Indianhead lentil plots were infested with green foxtail, especially those on coarse, textured soils. Two fields were tilled after only eight weeks of growth, because of high weed densities. Of these two, one field was cultivated and one was worked with an undercutter.

Two fields were treated with a herbicide to terminate growth after approximately ten weeks of growth. Sweep was used in one field and 2,4-D in the other. These fields were left standing through the remainder of the summer in hope of trapping snow this winter.

The remaining two fields were cultivated after approximately ten weeks of growth.

Due to extreme drought in May and early June, the cooperators at Fiske and Rosetown decided not to seed the lentil.

The early July seeding at Lucky Lake took advantage of July and early August precipitation resulting in a very dense stand. The only weed present was wild oats and it was minor. While dry matter production was tremendous, the water use was also significant. Nature acted as the dessicant. The first killing frost occurred in late September. The field is currently covered by a mat of lentil residue waiting for a snowfall.

Cooperator reaction to the Indianhead lentil was positive. Several plan to seed it on summerfallow land in 1988.

Cereal yields on the Indianhead lentil stubble will be compared to those on adjacent conventional fallow in 1988. Previous research has indicated that wheat yields following an annual legume plow-down crop can be comparable to yields after conventional summerfallow.

There can be exceptions. Dr. Slinkard reported that in 1987 cereals grown on Indianhead lentil stubble averaged 70% of cereals yields on summerfallow. Dry conditions in April, May and June overrode any beneficial effect of the green manure crop. These conditions emphasize the need for moisture conservation.

Perhaps there is potential for implementation of trap strips. Strip seeders mounted on cultivators or undercutters could sow flax or canola strips during the plow-down operation.

In summary, the Indianhead lentil project provided farmers in the Dark Brown soil zone with an opportunity to assess various management options.

On the basis of what we saw in 1987, it would appear that early seeding with a discer was most successful. A fall 2,4-D treatment to control winter annuals the year prior to seeding Indianhead lentil is recommended. Seed at the recommended rate of 30 lbs per acre. Inoculate the seed with the pea and lentil strain of Rhizabium. Be flexible.

The combination of low seed cost and higher water-use efficiency makes the Indianhead lentil a viable substitute to summerfallow.